AP Biology, Semester 1
Unit Quiz: Evolutionary Biology
Instructor Version

Section I: Multiple-Choice Questions

Answer Sheet

1.	B
2.	B
3.	C
4.	E
5.	C
6.	D
7.	A
8.	B
9.	E
10.	A

11.	B
12.	D
13.	C
14.	E
15.	C
16.	C
17.	E
18.	D
19.	B
20.	A

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Section II: Free-Response Questions

Time Limit: You have 30 minutes to complete this section. Both questions are weighted equally, so allow around 15 minutes for each question. You may move back and forth between questions until time is called.

Scoring: 20 points each, 40 points total

Directions: Answer each of the questions in essay form. Outline form is not acceptable. Labeled diagrams may be used to supplement your answer, but a diagram alone is insufficient. Read each question carefully before you begin to write your answer.

Note: The student's answers should be in prose form, not outline form; tables are presented here to assist grader in identifying important elements of each answer.

1. **Evolution, through natural selection, causes changes in a population over time. But there are some limitations to how natural selection can change a population.**

   A. Explain how natural selection occurs, including its limitations.

Natural selection	Limitations
• There is variation in a population. • Individuals with more advantageous traits produce more offspring. • The unequal ability to survive and reproduce leads to gradual changes in a population.	• Only works on variations already present in a population • Only works on heritable traits that can be passed on to offspring • Causes changes in a population, not an individual

   B. Explain how genetic diversity is maintained in a population, despite the effects of natural selection.

	Preserves diversity
Diploid character	Hides unfavorable traits in the form of recessive alleles in heterozygous individuals
Balanced polymorphism	Different alleles coexist without any noticeable change in their frequency; examples are heterozygote advantage and hybrid vigor
Environment	Drives divergent evolution and preserves different phenotypes
Frequency-dependent selection	Reproductive success declines whenever a phenotype becomes too common

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2. **Evolutionary change is driven by genetic drift, gene flow, nonrandom mating, and natural selection.**

   Define each of these forces and explain how each promotes evolutionary change.

	Definition	Evolutionary change
Genetic drift	The change in the gene pool of a small population due to chance	• Changes allele and genotype frequencies • Advantageous allele may become prevalent
Gene flow	The change in a population's allele frequencies resulting from migration	• Changes allele and genotype frequencies • New allele may enter the population
Nonrandom mating	The selection of mates on the basis of a trait or group of traits, not by chance	• Changes genotype frequencies • Sexual selection and assortative mating may occur
Natural selection	The process of evolutionary adaptation in which the genotypes best suited to survive and reproduce give rise to a greater number of offspring, over time changing the genotype frequencies of a population	• Changes allele and genotype frequencies • Stabilizing selection, directional selection, or diversifying selection may occur • Genotypes most suited to survive and reproduce give rise to a greater number of offspring

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